Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application. Claims 5-18, 21-23, 25-31, 36-48, 50, 51 and 54-59 are pending. By the present amendment, claims 19, 20, 49, 53 and 60 have been canceled without prejudice or disclaimer as to the subject matter contained therein, and claims 21, 23, 25, 36, 37, 41, 50 and 54 have been amended.

Listing of Claims:

Claims 1-4. (*Canceled*).

Claim 5. (*Previously Presented*) The MRI system of claim 58, wherein the first scan is is carried out using a pulse sequence generating an echo signal to map echo data in a central region of a first k-space for producing the image, the central region corresponding to a lower-frequency region in a phase-encode direction of the first k-space, and

the second scan is carried out using a pulse sequence generating an echo signal to map echo data in both a central region and one of both end regions other than the central region of a second k-space for producing the image, the central region corresponding to a lower-frequency region in a phase-encode direction of the second k-space and both of the end regions corresponding to a higher-frequency region in the phase-encode direction of the second k-space.

Claim 6. (*Previously Presented*) The MRI system of claim 5, wherein the image producing unit includes duplicating means for duplicating echo data existing in one end

region of the second k-space to one of both end regions of the first k-space, the one end region of the first k-space being yet to be mapped with echo data, and calculating means for calculating, with regard to each of the first and second k-spaces, additional echo data based on the half-Fourier technique so that the calculated additional echo data is mapped into the remaining end region being yet to be mapped.

Claim 7. (*Previously Presented*) The MRI system of claim 6, wherein the image producing means includes arterial phase image producing means for obtaining one of echo data and image data representing an arterial phase image through a predetermined type of calculation executed between one of echo data of the first k-space and image data thereof and one of echo data of the second k-space and image data thereof.

Claim 8. (*Previously Presented*) The MRI system of claim 7, wherein the predetermined type of calculation executed by the arterial phase image producing means is one of subtraction, weighted difference calculation, and addition.

Claim 9. (*Previously Presented*) The MRI system of claim 7, wherein the image producing unit includes venous phase image producing means for obtaining one of echo data and image data thereof representing a venous phase image by executing subtraction between one of echo data of image data representing the arterial phase image obtained by the arterial phase image producing means and one of echo data of the second k-space and image data thereof.

Claim 10. (*Previously Presented*) The MRI system of claim 58, wherein each of the first and second scans is either one of a two-dimensional scan and a three-dimensional scan.

Claim 11. (*Previously Presented*) The MRI system of claim 58, wherein the unit is configured to execute the MR imaging scan with a pulse sequence based on one of an EPI (Echo Planar Imaging) technique and an FSE (Fast Spin Echo) technique.

Claim 12. (*Previously Presented*) The MRI system of claim 58, wherein the time phase setting unit has detecting means for detecting a signal indicative of the cardiac time phases of the object, preparing means for obtaining a plurality of MR images by executing a preparing MR sequence a plurality of times toward the region to be imaged of the object at different timings from a heartbeat reference wave appearing cyclically in the signal detected by the detecting means, and means for determining the two cardiac time phases from the plurality of MR images obtained by the preparing means.

Claim 13. (*Original*) The MRI system of claim 12, wherein the signal indicative of the cardiac time phases is an ECG signal of the object and the heartbeat reference wave is an R-wave of the ECG signal.

Claim 14. (*Previously Presented*) An MR imaging method of obtaining an image relating to fluid within a region to be imaged of an object, comprising:

setting two different cardiac time phases falling into a systole and a diastole of a cardiac cycle of the object;

performing toward the region to be imaged of the object, an MR imaging scan starting in turn at each of the two cardiac time phases to acquire two sets of echo data, the MR imaging scan comprising a first scan starting at one of the two cardiac time phases falling in the systole and a second scan starting at the other of the two cardiac time phases falling in the diastole, both of the first scan and the second scan being based on a half-Fourier technique; and

producing, from the two sets of acquired echo data, the image relating to the fluid.

Claim 15. (*Previously Presented*) The MRI system of claim 58, wherein the scanning unit is configured to execute a pulse sequence including readout gradient pulse of which applied direction is substantially in accordance with a moving direction of the fluid.

Claim 16. (*Previously Presented*) The MRI system of claim 15, wherein the readout gradient pulse has a main pulse for reading out the echo signal and a control pulse for controlling behaviors of magnetic spins of the fluid concerning a phase of the magnetic spins, the control pulse being added to the main pulse on a time axis thereof.

Claim 17. (*Original*) The MRI system of claim 16, wherein the control pulse is a pulse responsible for at least one of dephasing and rephasing of the magnetic spins.

Claim 18. (*Previously Presented*) The MRI system of claim 16, further comprising a unit configured to control an intensity of the control pulse in accord with a flow velocity of the fluid.

Claims 19-20. (*Canceled*).

Claim 21. (*Currently Amended*) ~~The MRI system of claim 60[[,]]~~ An MRI system for obtaining an image relating to fluid within an object, in which the object placed in a static magnetic field is subjected to a scan based on a pulse sequence including a readout gradient pulse, comprising:

a time phase setting unit configured to set a cardiac time phase of the object;

a scanning unit configured to perform the scan at the cardiac time phase to acquire an echo signal from the object under a condition that an applied direction of the readout gradient pulse is substantially in accordance with a moving direction of the fluid in motion within the object; and

an image producing unit configured to produce, from the echo signal, the image relating to the fluid,

wherein the readout gradient pulse has a main pulse for reading out the echo signal and a control pulse for controlling behaviors of magnetic spins of the fluid concerning a phase of the magnetic spins, the control pulse being added to the main pulse ~~on~~ along a time axis ~~thereof~~ of the main pulse.

Claim 22. (*Original*) The MRI system of claim 21, wherein the control pulse is a pulse responsible for at least one of dephasing and rephasing of the magnetic spins.

Claim 23. (*Currently Amended*) ~~The MRI system of claim 60~~[[,]] An MRI system for obtaining an image relating to fluid within an object, in which the object placed in a static magnetic field is subjected to a scan based on a pulse sequence including a readout gradient pulse, comprising:

a time phase setting unit configured to set a cardiac time phase of the object;

a scanning unit configured to perform the scan at the cardiac time phase to acquire an echo signal from the object under a condition that an applied direction of the readout gradient pulse is substantially in accordance with a moving direction of the fluid in motion within the object; and

an image producing unit configured to produce, from the echo signal, the image relating to the fluid,

wherein the time phase setting unit is configured to set two cardiac time phases of the object,

the scanning unit is configured to acquire data comprising two sets of echo signals by applying first and second scans to the object at the two cardiac time phases, respectively; and

the image producing unit is configured to produce an image of the fluid from the data.

Claim 24. (*Canceled*)

Claim 25. (*Currently Amended*) The MRI system of claim 22, wherein the readout gradient pulse has a main pulse for reading out the echo signal and a control pulse for controlling behaviors of magnetic spins of the fluid concerning a phase of the magnetic spins, the control pulse being added to the main pulse ~~on~~ along a time axis ~~thereof~~ of the main pulse.

Claim 26. (*Original*) The MRI system of claim 25, wherein the control pulse is a pulse responsible for at least one of dephasing and rephasing of the magnetic spins.

Claim 27. (*Previously Presented*) The MRI system of claim 26, wherein the control pulse belonging to the readout gradient pulse in the pulse sequence used for each of the first and second scans is formed as a pulse responsible for at least one of the dephasing and rephasing.

Claim 28. (*Previously Presented*) The MRI system of claim 26, wherein the control pulse belonging to the readout gradient pulse in the pulse sequence used for the first scan executed at one of the two cardiac time phases is formed as a pulse responsible for the

dephasing and the control pulse belonging to the readout gradient pulse in the pulse sequence used for the second scan executed at the other cardiac time phase is formed as a pulse responsible for the rephasing.

Claim 29. (*Previously Presented*) The MRI system of claim 28, wherein the time phase setting is configured to set the one cardiac time phase falling into a diastole of the object and set the other cardiac time phase falling into a systole of the object.

Claim 30. (*Previously Presented*) The MRI system of claim 25, wherein the control pulse is changeable in a wave area thereof.

Claim 31. (*Previously Presented*) The MRI system of claim 23, wherein the scanning unit is configured to sequentially perform the first and second scans on either the same slice of the region or volume of the region specified by each slice encode during one time of imaging for the object.

Claims 32-35. (*Canceled*).

Claim 36. (*Currently Amended*) The MRI system of claim ~~20~~ 23, wherein the fluid is a blood flow within the object.

Claim 37. (*Currently Amended*) The MRI system of claim 36, wherein the blood flow consists of an artery and a vein slowly flowing in an inferior limb of the object, and

the image producing unit has artery/vein image producing means that produces images in which the artery and vein are ~~shown separately~~ visually separated from each other.

Claim 38. (*Previously Presented*) The MRI system of claim 23, wherein each of the first and second scans is formed based on a half-Fourier technique.

Claim 39. (*Previously Presented*) The MRI system of claim 38, wherein the first scan carried out using a pulse sequence generating an echo signal to map echo data in a central region of a first k-space for producing the image, the central region corresponding to a lower-frequency region in a phase-encode direction of the first k-space, and

the second scan is carried out using a pulse sequence generating an echo signal to map echo data in both of a central region and one of both end regions other than the central region of a second k-space for producing the image, the central region corresponding to a lower-frequency region in a phase-encode direction of the second k-space and both of the end regions corresponding to a higher-frequency region in the phase-encode direction of the second k-space.

Claim 40. (*Previously Presented*) The MRI system of claim 39, wherein the image producing unit has duplicating means for duplicating echo data existing in the one end

region of the second k-space to on of both end regions of the first k-space, the one end region of the first k-space being yet to be mapped with echo data, and calculating means for calculating, in each of the first and second k-spaces, additional echo data based on the half-Fourier technique so that the calculated additional echo data is mapped into the remaining end region being yet to be mapped.

Claim 41. (*Currently Amended*) The MRI system of claim 40, wherein the image producing unit includes arterial phase image producing means for obtaining one of echo data and image data representing an arterial phase image through a ~~predetermine~~ predetermined type of calculation executed between one of echo data of the first k-space and image data thereof and one of echo data of the second k-space and image data thereof.

Claim 42. (*Previously Presented*) The MRI system of claim 41, wherein the predetermined type of calculation executed by the arterial phase image producing means is one of subtraction, weighted difference calculation, and addition.

Claim 43. (*Previously Presented*) The MRI system of claim 41, wherein the image producing unit includes venous phase image producing means for obtaining one of echo data and image data thereof representing a venous phase image by executing subtraction between one of echo data of image data representing the arterial phase image obtained by

the arterial phase image producing means and one of echo data of the second k-space and image data thereof.

Claim 44. (*Original*) The MRI system of claim 38, wherein each of the first and second scans is either one of a two-dimensional scan and a three-dimensional scan.

Claim 45. (*Previously Presented*) The MRI system of claim 23, wherein the pulse sequence used by each of the first and second scans is composed of a train of pulses based on one of a FASE (Fast Asymmetric SE) technique, EPI (Echo Planar Imaging) technique, FSE (Fast Spin Echo) technique, and SE (Spin Echo) technique.

Claim 46. (*Previously Presented*) The MRI system of claim 38, wherein the time phase setting unit has detecting means for detecting a signal indicative of the cardiac time phases of the object, preparing means for obtaining a plurality of MR images by executing a preparing MR sequence a plurality of times toward the region to be imaged of the object at different timings from a heartbeat reference wave appearing cyclically in the signal detected by the detecting means, and means for determining the two cardiac time phases from the plurality of MR images obtained by the preparing means.

Claim 47. (*Previously Presented*) The MRI system of claim 46, wherein the signal indicative of the cardiac time phases is either an ECG signal or a PPG signal of the object

and the heartbeat reference wave is an R-wave of either of the ECG signal or the PPG signal.

Claim 48. (*Previously Presented*) The MRI system of claim 21, comprising a unit for controlling an intensity of the control pulse in accord with a flow velocity of the fluid.

Claim 49. (*Canceled*).

Claim 50. (*Currently Amended*) ~~The MR imaging method of claim 49~~[[,]] An MR imaging method of obtaining an image relating to fluid within a region to be imaged of an object, comprising:

setting a cardiac time phase of an object;

performing, toward the region to be imaged of the object, a scan at the cardiac time phase with use of a pulse sequence including a readout gradient pulse of which applied direction is substantially in accordance with a moving direction of fluid in motion within the object, so that an echo signal is acquired; and

producing, from the echo signal, the image relating to the fluid,

wherein the readout gradient pulse has a main pulse to read out the echo signal and at least one of a dephase pulse and a rephase pulse responsible for dephasing and rephasing phases of magnetic spins of the fluid, respectively, the at least one pulse being added to the main pulse ~~on~~ along a time axis ~~thereof~~ of the main pulse.

Claim 51. (*Previously Presented*) An MRI system for obtaining an image relating to fluid within a region to be imaged of an object, comprising:

a magnet for generating a static magnetic field in which an object is placed;

an RF coil device through which an RF magnetic field is transmitted to the object and an echo signal emanated from the object is received;

a transmitter for transmitting the RF magnetic field to the object through the RF coil device, the RF magnetic field being based on a pulse sequence;

a gradient power supply for applying a gradient based on the pulse sequence to the object through a gradient coil;

a receiver for receiving the echo signal through the RF coil device, the echo signal being generated in response to performance of the pulse sequence;

a calculating unit for producing the echo signal received by the receiver into the image; and

a controller for controlling operations of the transmitter, receiver and gradient power supply in conformity with the pulse sequence,

wherein the controller controls the operations of transmitter, receiver and gradient power supply so that two different cardiac time phases falling into a systole and a diastole of a cardiac cycle of the object are set, and, as the pulse sequence, an imaging scan is executed in synchronism with each of the two different cardiac time phases in turn to acquire two sets of the echo signal, the imaging scan comprising a first scan starting at one of the two cardiac time phases falling in the systole and a second scan starting at the

other of the two cardiac time phases falling in the diastole, both of the first scan and the second scan being based on a half-Fourier technique, and

the calculating unit produces the image relating to the fluid within the region to be imaged of the object from the two sets of the echo signal acquired correspondingly to each of the two different cardiac time phases.

Claims 52-53. (*Canceled*).

Claim 54. (*Currently Amended*) ~~The MRI system of claim 53~~[[,]] An MRI system for obtaining an image relating to fluid within a region to be imaged of an object, comprising:

a magnet for generating a static magnetic field in which an object is placed;

an RF coil device through which an RF magnetic field is transmitted to the object and an echo signal emanated from the object is received;

a transmitter for transmitting the RF magnetic field to the object through the RF coil device, the RF magnetic field being based on a pulse sequence;

a gradient power supply for applying a gradient based on the pulse sequence to the object through a gradient coil;

a receiver for receiving the echo signal through the RF coil device, the echo signal being generated in response to performance of the pulse sequence;

a calculating unit for producing the echo signal received by the receiver into the image; and

a controller for controlling operations of the transmitter, receiver and gradient power supply in conformity with the pulse sequence,

wherein the controller controls the operations of transmitter, receiver and gradient power supply so that a cardiac time phase of the object is set and, as the pulse sequence, a pulse sequence for an imaging scan is executed in synchronism with the cardiac time phase, the imaging-scan pulse sequence including a readout gradient pulse of which applied direction being substantially in accordance with a moving direction of fluid in motion within the object,

the calculating unit produces the image relating to the fluid within the object from the echo signal acquired through the receiver correspondingly to performance of the imaging-scan pulse sequence, and

wherein the readout gradient pulse has a main pulse to read out the echo signal and a control pulse to control behaviors of magnetic spins of the fluid concerning a phase of the magnetic spins, the control pulse being added to the main pulse ~~on~~ along a time axis ~~thereof~~ of the main pulse.

Claim 55. (*Original*) The MRI system of claim 54, wherein the control pulse is formed into a pulse responsible fore at least one of dephasing and rephasing the magnetic spins.

Claim 56. (*Previously Presented*) The MRI system of claim 55, wherein the cardiac time phase comprises two cardiac time phases falling into a systole and a diastole of the object, respectively, and

the imaging scan consists of a first scan and a second scan made to start at the two cardiac time phases, respectively.

Claim 57. (*Previously Presented*) An MRI system for obtaining an image relating to fluid within a region to be imaged of an object, comprising:

time phase setting means for setting two different cardiac time phases falling into a systole and a diastole of a cardiac cycle of the object;

scanning means for performing, toward the region to be imaged of the object, an MR imaging scan starting in turn at each of the two cardiac time phases set by the time phase setting means to acquire two sets of echo data, the MR imaging scan comprising a first scan starting at one of the two cardiac time phases falling in the systole and a second scan starting at the other of the two cardiac time phases falling in the diastole, both the first scan and the second scan being based on a half-Fourier technique; and

image producing means for producing, from the two sets of echo data acquired by the scanning means, the image relating to the fluid.

Claim 58. (*Previously Presented*) An MRI system for obtaining an image relating to fluid within a region to be imaged of an object, comprising:

a time phase setting unit configured to set two different cardiac time phases falling into a systole and a diastole of a cardiac cycle of the object;

a scanning unit configured to perform, toward the region to be imaged of the object, an MR imaging scan starting in turn at each of the two cardiac time pahses set by the time phase setting unit to acquire two sets of echo data, the MR imaging scan comprising a first scan starting at one of the two cardiac time phases falling in the systole and a second scan starting at the other of the two cardiac time phases falling in the diastole, both the first scan and the second scan being based on a half-Fourier technique; and

an image producing unit configured to produce, from the two sets of echo data acquired by the scanning unit, the image relating to the fluid.

Claim 59. (*Previously Presented*) The MRI system of claim 58, wherein the scanning unit is configured to perform both the first and second scans, respectively, on either the same slice of the region or a volume of the region specified by each slice encodes.

Claim 60. (*Canceled*).